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Park-making.

THOSE who make public parks are apt to attempt too much and to injure not only the beauty, but the practical value of their creations by loading them with unnecessary and costly details. From the time when landscape-gardening was first practiced as a fine art to the present day, park-makers have been ambitious to change the face of Nature—to dig lakes where lakes did not exist and to fill up lakes where they did exist, to cut down natural hills and to raise artificial ones, to plant in one place and to clear in another, and generally to spend money in construction entirely out of proportion to the value of the results obtained.

The best art is simple in its expression, and the highest form of art in gardening is perhaps that which, taking advantage of such natural conditions as it finds, makes the best of them with the smallest expenditure of labor and money. Simplicity of design means not only economy of construction, but, what is of even more importance, economy of maintenance. The importance of making it possible to keep a great park in good condition without excessive annual expenditures for maintenance is a simple business proposition which would not seem to require much demonstration. Yet park-makers, with their unnecessary walks and drives, with their expensive buildings which are always getting out of repair; their ponds, in which there is rarely water enough to keep them fresh; their brooks, which are frequently dry; their elaborate planting schemes often ill-suited to the positions where they are wanted, make parks expensive to construct and impossible to maintain in good condition, especially in this country, where the cost of labor is heavy and there is difficulty in obtaining under existing municipal methods skilled and faithful gardeners to keep anything like an elaborate garden in good condition. The most superficial examination of any of our large urban parks will show that wherever elaborate construction and planting have been attempted they have failed from subsequent neglect to produce the effects expected from them, and that broad, quiet, pastoral and sylvan features are the only permanent and really valuable ones we can hope to attain in our great city parks.

It is needless, perhaps, to repeat what has been said so often in the columns of this journal, that, in our judgment, the greatest value and only justification of great urban parks exist in the fact that they can bring the country into the city and give to people who are obliged to pass their lives in cities the opportunity to enjoy the refreshment of mind and body which can only be found in communion with Nature and the contemplation of beautiful natural objects harmoniously arranged. Parks have other and very important uses, but this is their highest claim to recognition. If it is the highest duty of the park-maker to bring the country into the city, every road and every walk not absolutely needed to make the points of greatest interest and beauty easily accessible is an injury to his scheme, and every building and unnecessary construction of every kind reduces the value of his creation, as do trees and shrubs and other flowering plants which are out of harmony with their surroundings. Such things injure the artistic value of a park; they unnecessarily increase its cost and make the burden of annual maintenance more difficult to bear. Simplicity of design often means a saving of unnecessary expenditure, but it should not mean cheapness of construction. The most expensive parks to maintain are those which have been the most cheaply constructed, for cheap construction means expensive maintenance. Roads and walks should not be made where they are not needed, and they should not be made unnecessarily wide to accommodate possible crowds of another century, but those that are built should be constructed in the most thorough and durable manner possible in order to reduce the cost of future care. When lawns are made the work should be done thoroughly; and no tree or shrub should be planted in any manner but the best and in the most carefully prepared soil. Only as little work as possible should be done, but it should be done in the most permanent manner. The best investment a park-maker can make is in good soil, for without an abundance of good soil it is impossible to produce large and permanent trees and good grass, and the chief value of any park is in its trees and grass; and if the money which has been spent in disfiguring American parks with unnecessary buildings and miscellaneous architectural terrors had been used in buying loam, they would not now present the dreary ranks of starved and stunted trees and the great patches of worn-out turf which too often disfigure them. Only the hardiest trees and shrubs should be used in park-planting, for there is no economy in planting trees or shrubs which are liable to be killed any year, partially if not entirely by frost or heat or drought, which annually ruin many exotic garden plants, nor is it wise to use in public parks plants which, unless carefully watched, are disfigured every year by insects. It costs a great deal of money to cut out dead and dying branches from trees and shrubs, to remove dead trees and fight insects, but work of this sort must be done, unless the selection of plants used to decorate our parks is made with the greatest care. Fortunately, the trees and shrubs which need the least attention, and are therefore the most economical ones to plant, are the best from an artistic point of view; and to produce large effects and such scenery as painters like to transfer to canvas, no great variety of material is needed. The most restful park scenery, and, therefore, the best can be obtained by using judiciously a small number of varieties of the hardiest trees and shrubs, and the wise park-maker will confine his choice to those species which Nature helps him to select, and which, therefore, stand the best chance of permanent success. No park can be beautiful unless the trees which adorn it are healthy, and no tree is healthy which suffers from uncongenial climatic conditions and insufficient nourishment. Even if they are not inharmonious in a natural combination, the trees and shrubs which need constant pruning to keep them from looking shabby are too expensive for park use and should, therefore, be rejected when broad natural effects in construction and economy of maintenance are aimed for by the park-maker.

The sum of the matter of park construction is to make rural city parks less pretentious and artificial in design and to so construct them that the cost of maintenance will be reduced to the minimum. This will save money and lessen the danger of exhibitions of bad taste and encourage that simplicity which should be the controlling motive of sincere art.

Mr. Binger Hermann, the Commissioner of the General Land Office, devotes considerable space in his first annual report to the discussion of the forest lands of the national domain and the laws under which they are administered; and among other recommendations asks for a large appropriation "to sustain a force of forestry agents to check the work of destruction," arguing in support of this proposition that a "well-managed force of agents would shortly prove more than self-supporting through the proceeds derived from the sale of timber effected by the Government."

The experience of the last twenty-five years has shown what the civil agents of the Interior Department can accomplish in protecting the property of the Government, and the utter futility of trying to enforce the laws of Congress and the regulations of the Department without the aid of soldiers, who have shown over and over again their ability to protect successfully and economically forests in the national parks from fire and pillage after the civil officers of the Interior Department had proved themselves entirely incapable of effective action. The nation's forests need protection badly enough, but it is worse than useless to attempt to protect them with the present methods and machinery of the Interior Department, and money appropriated by Congress for the purpose, unless it is to be expended in furnishing a military or quasi-military control in the forest reserves, will accomplish nothing beyond affording opportunity to the Department to pay good salaries to a few more political hangers-on. Every appropriation of this sort ought to fail.

A better idea of Mr. Binger Hermann's zeal for forest protection than can be obtained from his report will be found in the fact that largely upon his recommendation the great forest reserves of Oregon and Washington have been thrown open to sheep pasturage in direct opposition to the best advice of all scientific men, and with the full knowledge of the destructive effects of pasturage in mountain forests in this and in other countries. This is one of the things which has been done by the present administration for the protection of forests; another is the opening of 19,951,360 acres of reserved forest lands for entry and for personal and corporate stealing during a period of seven months. Discouraging as all this has certainly been, there is comfort to be found for those who believe in the importance of forest preservation in the gradual change of feeling among the people of the west themselves since the discussions which followed the publication of Mr. Cleveland's proclamations of February 22d last, and which much more than anything that has ever been done have called the attention of the public to the importance of preserving the forests of the national domain. We have always believed that the politicians in Washington who shouted the loudest against the reservations represented only a small interested class of the community which elected them, and that the persons who do not live by plundering the Government would, as soon as they understood the meaning and necessity of the reservations, be strongly in favor of them. We are glad, therefore, to find these views confirmed in a recent issue of *Forest and Stream*, which has always been much interested in forest preservation, and is usually well informed on the condition of western forests. "A recent investigation," it says, "of the state of public opinion over a very large portion of the west shows that where a short half-year ago entire communities were bitterly opposed to the establishment of the forest reserves the same communities are now heartily in favor of such an establishment. Where there was bitter hostility there is now cordial friendliness." Nevertheless, it must be borne in mind, gratifying as this change of public opinion is, that the persons who want to despoil the public domain are rich, organized and represented in Congress, and that it will be difficult to organize the scattered forces of those interested in preserving the forests in time to make their power felt in Washington before all the really valuable forest property of the nation has been destroyed. When this has occurred, and there are no more valuable forests, and nothing more is to be made out of the public domain, the big mining and lumber companies and their Washington representatives will all favor forest preservation.

Notes on Cultivated Conifers.—XI.

THE Hemlocks (Tsuga) may be recognized by their slender drooping terminal shoots, flat or angled, conspicuously-stalked leaves articulated on persistent bases, which finally become woody, subglobose-stalked staminate flowers produced in the axils of leaves of the previous year, and terminal female flowers maturing in one season into small usually pendulous cones with persistent scales. Of the two sections into which the Hemlock-trees are grouped, the first, Eutsuga, is distinguished by its flat obtuse or emarginate leaves, usually stomatose only on the lower surface, and by small cones rarely exceeding an inch in length, while in Hesperopeuce, with a single species of western North America, the leaves are acute, convex or keeled above and stomatose on both surfaces, and the cones are from two to nearly four inches in length. The genus, which is now confined to North America, Japan, central China and the Himalayas, consists of seven species, two occurring in eastern North America, two in western North America, one in Japan, one in Japan and China and one in northern India. They are all large trees with thick bark rich in tannic acid and brittle coarse-grained wood.

The Hemlock which is most interesting and valuable to us here in eastern North America is the native Tsuga Canadensis, a large tree, generally and widely scattered from Nova Scotia to Minnesota and southward through the northern states and along the high Appalachian Mountains to northern Alabama. The Hemlock, which delights in cool northern slopes, the rocky banks of mountain streams and dark narrow ravines, is one of the most splendid inhabitants of the northern forest. Too much neglected by those who make parks and gardens in the northern states for less beautiful and permanent foreign trees, no other conifer, nevertheless, which can be used here equals it when a specimen is needed to stand alone on a lawn, and with no other tree can such dark dense masses of foliage be made here. Although usually found in the forest on northern slopes or in shaded ravines, the Hemlock will grow in full exposure to the sun; isolated trees, however, suffer from the dry cold winds of the late winter and early spring, and it is usually advisable to protect young trees by thick planting. Quick thinning, however, should follow thick planting, for the Hemlock loses its greatest charm as a lawn-tree when it is deprived of its lowest branches, which, with abundant light and air, are vigorous and long-lived, and make an isolated Hemlock-tree, with its long branches gracefully sweeping the ground, a broad-based pyramid of great beauty. Young trees, which are easily transplanted from the woods, grow rapidly in good soil into handsome specimens, and if planters could only disabuse their minds of the idea that a tree is common, and therefore should not be used in ornamental planting because it grows naturally in their neighborhood, there is no reason why this Hemlock should not become one of the greatest ornaments in all northern parks.

There are a number of abnormal forms of Tsuga Canadensis in gardens. The most distinct of them was found about forty years ago on the Fishkill Mountains, in New York, and was first cultivated and made known by Mr. H. W. Sargent. This plant, which is now usually called in gardens Sargent's Hemlock, is a bush about three feet high

with short pendant branches and branchlets, forming a remarkably dense, compact, flat-topped mass of foliage. Several of these plants were originally found together and transplanted, and the largest of them which I have seen is on the Howland estate, in Matteawan, New York, and is now about twenty-five feet across. This variety has been propagated by grafting the branches on the ordinary Hemlock, but in a few years the grafted plants form an erect stem and lose the dense low habit which is the charm of the original seedlings. There are a number of dwarf erect forms of the Hemlock in cultivation and others with branches a little more pendulous than ordinary. On the variety macrophylla, which is common in European collections, the leaves are crowded and dark green, and on the variety albo-spica the leaves are slightly defaced with pale markings. None of the varieties, however, with the exception of Mr. Sargent's Hemlock, have much to recommend them as ornamental plants, and usually they are prized only by lovers of vegetable monstrosities.

The second Hemlock of eastern North America, Tsuga Caroliniana, is distinguished from the better-known Tsuga Canadensis by its larger, broader and darker-colored leaves, from six to ten lines long and retuse or often notched at the apex, and by its larger cones with oblong scales longer than wide and spread at maturity nearly at right angles to the axis of the cone. The Carolina Hemlock, which grows usually on dry rocky ridges and the banks of mountain streams mostly at elevations between 2,000 and 2,500 feet above the sea-level, is distributed along the Blue Ridge from south-western Virginia to South Carolina generally in small groves, and frequently mingled with the other species. It is a beautiful tree of compact pyramidal habit, occasionally sixty feet in height, with a trunk rarely exceeding two feet in diameter, and dense dark green lustrous foliage. Sixteen years ago the Carolina Hemlock was first raised in the Arnold Arboretum, where it has proved quite hardy, promising to become here a first-rate ornamental tree. Still rare in gardens, this beautiful Hemlock is now gradually becoming known to the cultivators of ornamental trees.

The noblest of its race, at once the largest and the most graceful of all Hemlocks, Tsuga Mertensiana of the northwest coast, has not proved hardy here in New England, although there is still some hope that plants raised from seeds gathered in the exceedingly cold and comparatively dry interior regions of Montana, Idaho or British Columbia, to which this tree extends, may prove more satisfactory here than the plants taken from the warm wet coast region, although a first attempt made in the Arboretum with plants collected by Sereno Watson in Idaho in 1880 has not proved successful.

The second western American species, Tsuga Pattoni, the only representative of Hesperapeuce, is a tree with pendant branches densely clothed with dark green or with glaucous pale blue foliage and elongated bright purple or light green cones, which are usually pendulous, but in Alaska are occasionally erect, owing to the shortness of the much-thickened branchlets, due, no doubt, to the severity of the climate. Patton's Spruce is a tree of high alpine slopes, only reaching the sea-level, so far as is now known, in the neighborhood of Sitka, on Baranoff Island, and ranges from about latitude sixty degrees north southward along the high coast mountains, extending eastward in British Columbia to the Selkirks, and in the United States to the Cœur d'Alene and Bitter Root Mountains of Idaho and to northern Montana, and southward along the Sierra Nevada, where it is rarely seen below elevations of 10,000 feet above the sea-level. Patton's Spruce, with its drooping leading shoots and pendant branches clothed with slender waving spray which hide strength to withstand the fiercest mountain gales and the heaviest burdens of enveloping snow, is certainly the most beautiful of the alpine trees of this continent. Introduced into Europe about fifty years ago, it has proved hardy there, as it has on the Atlantic seaboard of New England. Here, however, like most alpine trees, it grows very slowly and still retains its dense pyramidal juvenile habit.

In Japan Hemlock-trees are common at high elevations, and the coniferous forests which cover the mountain ranges of central Hondo above 5,000 feet are chiefly composed of these trees and of Birches. Of the two species which inhabit Hondo, Tsuga diversifolia is the more northern and the larger tree. It is this tree which grows on the Nikkō Mountains above Lake Umoto (see GARDEN AND FOREST, vol. vi., f. 73), and which ranges as far north as the slopes of Mount Hakkoda, near Aomori. The second Japanese species, Tsuga Araragi (the Tsuga Sieboldi of many authors and the Tsuga Tsuga of others), is a more southern and a smaller tree, growing, as I saw it on Mount Komaga-taka, in scattered groves among deciduous-leaved trees and Pinus densiflora and not in continuous forests. Tsuga diversifolia, which is frequently eighty feet in height, with a trunk three or four feet in diameter, may be distinguished from the southern tree by its darker red bark, more slender branchlets covered with fine rufous pubescence, by its shorter and narrower leaves and much smaller cones which are rarely more than half an inch in length; while the longer, broader and more lustrous leaves and smooth lustrous orange-brown branchlets of Tsuga Araragi serve to distinguish the southern tree before it begins to bear cones, which are nearly an inch long. (See figures 62 and 63 on pages 492 and 493 of this issue, made from plants in the neighborhood of Boston.)

The two Japanese Hemlocks are successfully cultivated by Mr. Hunnewell in his pinetum at Wellesley, where they are both hardy and where there are fine plants of Tsuga Araragi, the largest being about sixteen feet in height, and smaller specimens of Tsuga diversifolia. Most of the Japanese Hemlocks in our gardens, however, belong to the northern species, which, although probably hardier, is a less attractive tree than Tsuga Araragi. This with its large lustrous leaves and excellent habit is certainly one of the most beautiful of the Hemlocks which are hardy in this climate, and if it proves its ability on a longer trial to maintain itself here in good condition, it will doubtless become a popular ornament of American gardens. Tsuga diversifolia is a less beautiful tree than our native Hemlock, and, unless it develops qualities which it has not shown yet in this country, it will probably never be very popular here.

The Hemlock with pubescent shoots and small cones found by Dr. Augustine Henry in the province of Hupeh, in central China, is probably the northern Japanese species, although the leaves of the Chinese plant are rather longer than those of the Japanese tree.

Tsuga dumosa, the Himalayan Hemlock, is scattered from Kumaon to Bootan at elevations between 8,000 and 10,500 feet above the sea-level, and is a noble tree occasionally 120 feet in height, with a trunk seven or eight feet in diameter, and longer leaves than those of the other species. I have never seen a specimen in the United States, and in Europe the Indian Hemlock has not grown particularly well. *C. S. S.*

The Cultivation of Citrus Fruits in California.

THE outlook for the Citrus-fruit growers of California for the coming season is the best in the history of the industry. The crop will be the largest. The fruit has now attained a reputation in eastern markets such as it has never had before, times are easier than at any period for the past few years, and tariff protection will give California growers an advantage not previously enjoyed. This advantage will be partially offset by a reduction of freight charges on fruit from the Mediterranean, but will still be appreciable. Under these conditions an outline of the development of Citrus-fruit culture, as a commercial industry in California, may be of interest.

Orange and Lemon trees are growing in nearly all of the counties of the state not exclusively in the mountainous sections, and many of these trees are bearing more or less fruit of very fair quality. For climatic reasons, however, the Citrus-fruit industry is and must be confined to a belt of country lying among the foot-hills of the Sierra Nevada mountains, and called the thermal belt. It stretches from San Diego to Tehama

County, a distance of over 700 miles, and varies in width from three or four miles to twenty-five or thirty. It is estimated that there are in this belt about a million and a half acres of land adapted to the safe cultivation of citrus fruits on a commercial basis, but whether all of this land is susceptible of irrigation is still undetermined.

The altitude ranges from 300 to 1,800 feet above sea-level. The mean summer temperature of this belt is somewhat higher in the northern portion than in the southern; but the mean winter temperature is higher in the southern than in the northern portion. The mean temperature for the year does not vary more than four degrees throughout the whole belt. The warmer temperature in the northern section during the growing season favors the earlier ripening of the fruit, while the warmer winter temperature in the southern section favors a safer and more general development of the industry.

All along this belt of country are especially protected or favored localities and also localities where it would be unsafe to attempt Citrus-fruit culture as a commercial enterprise. This is caused by the local topography of the country and does not depend much on the altitude. Wherever cold currents of air from high altitudes flow to the valley without interruption it would not be safe to attempt Citrus culture at any elevation within the sweep of these currents. On the other hand, wherever these descending currents are cut off or turned aside by spurs of the mountains, leaving the warm atmosphere of the day undisturbed during the night, there Orange and Lemon culture may be engaged in without danger from frost. In other words, the eddies of air currents must be selected and the main flow of these currents must be avoided.

Every one who has traveled along these Sierra foot-hills parallel with the valleys, particularly in the winter season and at night, will recall his surprise at the sudden changes in the temperature of the atmosphere within short distances. He may also remember to have noticed tender plants and shrubs seared and frost-bitten, although just over a ridge or cone the same plants or shrubs were in full leaf and growing luxuriantly. Want of attention to these facts has caused many disastrous failures in the cultivation of Citrus fruits in California.

It may be here observed that these peculiar natural phenomena are more striking and their lessons are more imperative north than south of the Tehachapi pass—for the reason that south of that point the coast range of mountains is broken up into fragments and the tempering influences of the waters and breezes of the ocean are more direct and powerful than further north, where this range is practically unbroken and the Citrus belt is farther inland. These disadvantages of the northern section are, however, somewhat counteracted by the fact that the drier and warmer summer atmosphere is a greater guarantee against the spread and damages of insect pests. The more elevated inland localities in the south have this same advantage over localities nearer the coast.

From the best information obtainable some Oranges were planted in the Mission San Gabriel, Los Angeles County, in the year 1804. The nucleus of Orange culture in California was formed in this place and at about the above date by Padre, or Father, Sanches. The second trees were planted in Los Angeles by Don Louis Vignes in 1834. Several other small plantings followed about that date, but no orchards were planted with a view to selling the fruit till the coming of American people to California. The historic orchard of William Wolfskill, at Los Angeles, was the first planted with an idea of profit and he was the subject of ridicule when it was learned by his neighbors that he entertained this idea. When he died he had a bearing orchard of twenty-eight acres and that year the fruit was sold on the trees for $25,000. A few trees were planted at Old San Bernardino by L. Van Leuven, in 1857, from seed grown by him. He also planted the same year forty-five trees obtained from Los Angeles. About two hundred were planted at Crafton by Myron H. Crafts about 1865. The first seeds were planted at Riverside in 1870, and the first trees in orchard grown from these seeds, in 1872 and 1873. In 1869 Frank A. Kimball planted some Orange and Lemon trees at National City, San Diego County. At that time there were two old Orange-trees growing in El Cajon valley. In 1862 H. M. White planted two Orange-trees in Frazier Valley, east of Porterville, Tulare County. The first orchard was planted in Porterville in 1883 by A. R. Henry. About the same date a small planting was made at Centerville, Fresno County. Some time in the sixties the noted tree at Bidwell's Bar, on the Feather River, in Butte County, was planted. The seed from which this tree was grown was planted by Jesse Morrill in his garden in Sacramento. A few trees were planted in his garden by the agent of the Marysville and Oroville Railroad as early as 1868 at Oroville, Butte County. Thus we find that as early as 1870 small Orange groves had been planted all along the foot-hills from San Diego to Butte County. Plantings in many of the valley counties had also been made up to this date, but these latter have served to prove the inadaptability of the valleys to the growth of the industry,

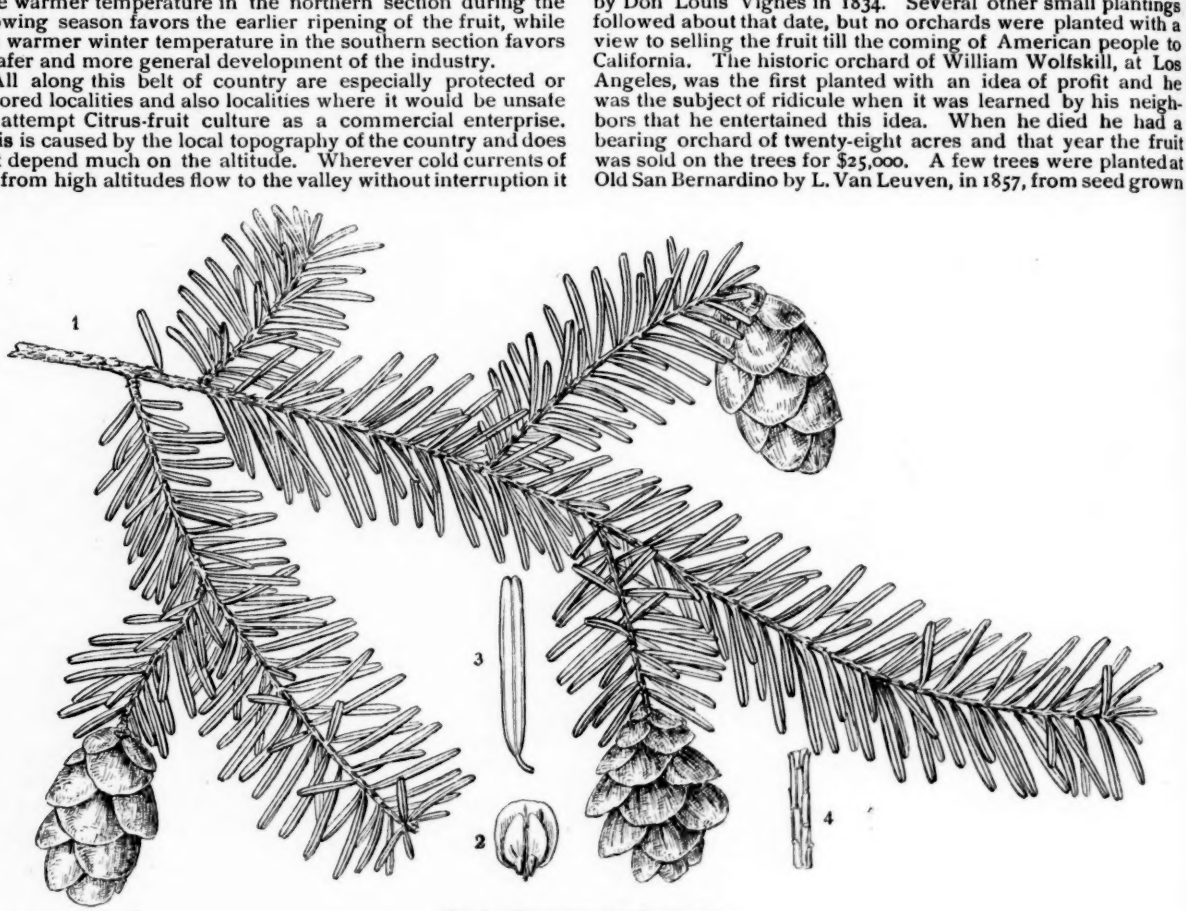

Fig. 62.—Tsuga Araragi.—See page 490.

1. A fruiting branch, natural size. 2. A cone-scale, with its seeds, natural size. 3. A leaf, natural size. 4. Portion of a branchlet, natural size.

while on the foot-hills the small beginnings have developed into one of the most permanent and profitable branches of horticulture in the state.

Although in early years the increase in planting, except in Los Angeles County, was quite slow, of late years it has been more rapid. In 1881, by official returns, the whole number of trees in the state was: Orange, 484,227, and Lemon, 62,130. Of these Los Angeles County had 450,125 of Orange and 48,350 of Lemon trees. Estimates of the number of Orange-trees now in the state vary between four millions and eight millions. There are of Lemon-trees one and a half millions. In 1879 Los Angeles County shipped fifteen cars of oranges out of the state. In 1890 there were shipped from the state 3,429 cars, mostly from three southern counties. By careful estimate California has this season to ship 12,000 cars of oranges and 1,500 cars of lemons. The receipts for oranges in 1890 to 1891 were $1,796,025. This season, at the same prices, the state should receive for oranges $6,300,000, and for lemons $675,000, a total of $6,975,000. The shipments this season will go from thirteen counties—San Diego, Riverside, San Bernardino, Santa Barbara, Ventura, Orange, Los Angeles, Tulare, Fresno, Sacramento, Placer, Butte and Tehama.

I have given the accepted estimate of this season's crop of oranges at 12,000 cars, but another reasonable estimate is 14,000 cars. If climatic conditions continue favorable the output will probably reach the latter figure. There will be a larger quantity of the best fruit than ever before, as the crop in those districts which produce the best will be largely increased. Riverside will have 4,000 cars instead of the 2,600 of last year; Redlands, 1,200 in place of 700; Ontario will increase seventy-five per cent, and the San Gabriel Valley expects double the crop of last year. The crop from the northern districts will probably not exceed 1,000 cars this year. But Tulare County is rapidly coming to the front as an Orange-growing section, and will soon be a noteworthy factor in the situation. It is interesting to note that this section and Redlands, both of which now grow fine oranges, were long considered unsuitable for Citrus culture: Tulare because it is so far north; Redlands because its northern slopes and heavy, red, clayey soil had not been tested. The two districts are at least 200 miles apart as the crow flies.

Early shipments have already gone forward from several localities; from Porterville and other places in the north; from Azusa, Covina and Highlands in the south, and shipping will be active from now on. The first carload was sent from Highlands October 23d. This is very early, and, although the fruit may have been well colored and pleasing in appearance, it could not have been very sweet and ripe. But the trade seems to demand these early shipments, and prices have been steady at $3.00 for best Navels, and $2.00 for best seedlings.

An innovation in marketing fruit has been established at Redlands, the results of which will be watched by growers with great interest. This is an effort to give growers and packers an equal voice in establishing the prices of oranges from time to time through the selling season, and to eliminate, as far as possible, the element of competition among the packers of this locality. It is believed that this effort will result in higher prices to the growers. An association known as the Redlands Citrus Union has been organized, with a general committee consisting of one representative from each firm of packers, one from the patrons of each firm among the growers, and five members of the Redlands Horticultural Club, an organization which has as its objects the general horticultural interests of the city. This general committee will meet from time to time to fix the minimum price at which the oranges of this section shall be sold. The packers have agreed, in writing, to abide by the price so fixed. This is an extension of the principle of coöperation which has already aided in bringing the Redlands oranges reputation and high prices. The experiment is regarded with favor by all those interested, and will undoubtedly receive a careful trial. Other localities are investigating its merits with a view to its adoption.

Some of the facts stated in this article with respect to the history and the limits of the cultivation of Citrus fruits in California were collected while engaged in work with Mr. I. N. Hoag.

Redlands, Calif. *William M. Tisdale.*

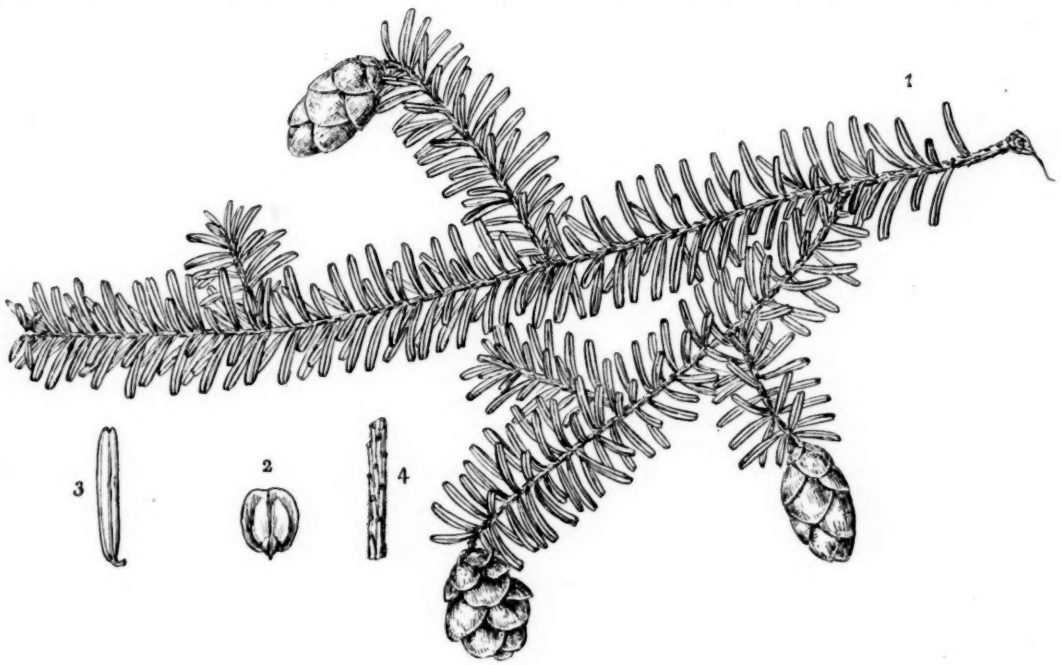

Fig. 63.—Tsuga diversifolia.—See page 490.

1. A fruiting branch, natural size. 2. A cone-scale, with its seeds, natural size. 3. A leaf, natural size. 4. Portion of a branchlet, natural size.

Foreign Correspondence.

London Letter.

BEGONIA GLOIRE DE LORRAINE.—At the risk of overdoing, I must again praise this beautiful plant. It has been a feature at every exhibition I have seen during the last two months; it has been and is the principal attraction in many gardens where warm-house plants are grown, and it is admired by all classes, even the Chrysanthemum worshippers stopping to praise it. Fogs do not appreciably hurt it, and it continues to flower all winter, its elegant flowers, colored bright rose-pink, being most decorative and useful in various ways. Scores of fine examples of it were shown at the last meeting of the Royal Horticultural Society.

Begonia Mrs. Heal.—This new hybrid, recently sent out by Messrs. Veitch, was shown in fine condition at this meeting, and plants a foot or so high showed fleshy dark green leaves six inches across and tall erect scapes with flowers two inches or more across and of the richest scarlet color. A second hybrid of the same parentage and origin was shown under the name of Julius. This is remarkable for its double, Carnation-like pale pink flowers, borne on nodding scapes and measuring nearly two inches across. It received an award of merit.

Carnation Winter Scarlet.—This useful addition to bright-colored winter-flowering Carnations was shown by Messrs. H. Low & Co., who have a large stock of it. It is superior to Winter Gem in its habit of flowering earlier, the latter being at its best in early spring, whereas this new variety is in perfection in November. It forms a compact plant eighteen inches high, with short, narrow foliage and numerous well-formed full flowers of a rich, glowing scarlet color.

Alberta magna.—A bush of this handsome Rubiaceous plant from Natal is now an attraction in a warm greenhouse at Kew. I have before noticed this plant when it flowered in a pot in a cold house, but it is much superior now after having been grown in an intermediate temperature and planted out. The leaves are as large and glossy as those of the common Laurel, and the terminal-branched racemes of bright crimson tubular flowers are thrice as large and much more effective than those borne by pot-grown plants. Flowering in winter, too, the plant is all the more valuable. I anticipate for it considerable popularity when it becomes better known.

Hybrid Orchids.—These were largely represented at the last meeting of the Royal Horticultural Society. Mr. Chamberlain sent Cattleyas and Lælias, among them a beautiful hybrid between C. Dowiana and L. præstans, in which the broad mauve-colored segments and the large open-crisped labellum, colored maroon-crimson, with streaks of a darker shade and a few splashes of yellow, were peculiarly attractive. Messrs. Linden showed Cypripedium Beekmani, said to be a hybrid between C. Boxalli and C. bellatulum, but showing little of the character of the latter, although quite different from and vastly superior to any form of C. Boxalli. The flower is very large and richly colored. C. insigne luciani, from the same exhibitors, is a near approach to the greatly treasured C. insigne Sanderæ. Messrs. Veitch & Sons showed Lælia Olivia, a hybrid between L. xanthina and L. crispa, and fairly intermediate in form and colors. Cattleya labiata, White Queen, is the best white form of this Cattleya that I have seen. Cypripedium Deedmanianum, raised in the Birmingham Botanic Garden from C. Chamberlaini and C. Spicerianum, has a scape nine inches long, with a flower in which the dorsal sepal is not unlike that of the latter parent, while the rest of the flower resembles in form and color the remarkable Chamberlaini.

Mushroom Culture.—The demand for mushrooms at all times of the year is a great and increasing one. Their cultivation has, therefore, become an important industry in the neighborhood of large towns, and particularly of London, where there are now numerous large market-gardens in which Mushroom culture is practiced on an extensive scale. The outdoor ridge method and the indoor shed method are practiced, and while the latter is, perhaps, somewhat more costly, the mushrooms thus produced are cleaner and generally better in flavor than those grown on ridges. I have lately had an opportunity of inspecting one of the largest of these Mushroom farms, that of Mr. Tebbutt, in Isleworth, near Richmond, who kindly gave me particulars of his methods, which I think may be of interest to readers of Garden and Forest.

Cultivation in the Open Air.—The ridges or raised beds are formed by arranging specially prepared horse-manure in mounds about a yard wide at the base and a yard high, narrowing it gradually from the base upward. These ridges may be any length to suit the convenience of the ground. The manure must be fresh horse-droppings and straw, and the better the food the horses have been fed upon the better the results will be. Manure from the stables of corn-fed horses is much superior to that from stables where the food is chiefly grass or hay and otherwise poor. This manure is turned three or four times before it is made into ridges. It is well shaken, pressed with forks and trodden down firmly as the ridge is being formed. The sides are then combed with forks and beaten with spades or forks. When finished it looks like a long ridge of straw arranged to throw off the rain. The temperature of the ridge must now be watched, as inserting the spawn in too great a heat would mean inevitable failure. When the temperature of the manure an inch or so below the surface has fallen to about eighty degrees pieces of spawn-brick two inches long and wide are inserted about nine inches apart all over the surface of the ridge. Two or three days later the ridge is coated with about two inches of soil, which is put on wet and beaten with spades, a good clayey loam being preferable to any other, although ordinary garden soil will serve. The ridge is then covered with straw litter; the longest of that taken from the manure heap when it is being turned is generally used. In cold weather this covering may be twelve inches thick, but in mild weather less will do. The temperature on the surface of the soil should be maintained at about sixty degrees. In from six to eight weeks the first crop of mushrooms will be up, and if the ridge is well made a continuous supply will be yielded for from eight to twelve months. The estimated cost of these ridges, including labor, rent, etc., is about five shillings for each lineal yard, while the yield of mushrooms from a yard is from twelve to fifteen pounds, the average value of which is one shilling a pound.

Cultivation under Cover.—The method of growing Mushrooms in large sheds or barns is as follows: The shed is divided into floors or shelves of wood four or five feet apart, with passages for convenience of working. Hot-water pipes are arranged for the purpose of keeping the requisite surface temperature in winter; the covering of litter is thus dispensed with. The manure is prepared in the same manner as for the ridges. It is then put on the floors or shelves, pressed down firmly, and when finished the layer of manure is from nine inches to a foot thick. The beds are spawned when the temperature is about eighty degrees, and a coating of wet clayey soil is placed over all and pressed down firmly with a wet board or the back of a spade. The mushrooms thus grown are perfectly free from litter or soil of any kind, and when placed in the punnets ready for market they are as white and smooth as eggs. Mr. Tebbutt grew two tons of mushrooms in an old barn last year, and he has this year built a shed about fifty by twenty-five feet, containing four layers of shelves or floors from which he expects four tons of mushrooms. During the winter and spring as much as two shillings a pound is not an unusual price for these first-grade mushrooms.

It is generally supposed that frost destroys the mycelium or spawn of the mushroom if allowed to get to these artificial beds, but Mr. Tebbutt has proved that frost does no harm beyond retarding the growth. Beds which had been frozen through in severe weather have yielded a good crop when brought on again by coatings and linings of fresh manure.

Many old disused buildings could be made to do good work by turning them into mushroom houses, and given good spawn, properly prepared stable-manure and intelligent management the production of mushrooms by the ton does not appear difficult of accomplishment.

London. *W. Watson.*

We are accustomed to speak of urban parks as the lungs of cities, but the ideal park is more than a laboratory for purifying the air. It does more than offer an invitation to agreeable physical exercise and a change of mental occupation. Contact with and contemplation of natural scenery, especially of pastoral scenery, brings positive refreshment to the mind. Green pastures and still waters now, as in the days of the Hebrew poet, restore the soul. This is a fundamental truth, and, therefore, it has profound practical importance.—*W. A. Stiles.*

Cultural Department.

New Vegetables.

Gregory's Surprise Pea.—This is an American variety said to have resulted from cross-breeding the Earliest of All and the American Wonder. The vine and leaf resemble those of the first sort. The green and dry peas are much like those of American Wonder, while the pod is intermediate in character. I have had it under observation in a small way for three seasons, and with me the comparatively slender vine grows to the height of about two and a half feet, does not branch, and bears its pods singly, the lower one at the seventh to the ninth node. The earliest pods have become fit for use a little before those of the Earliest of All, but it has not furnished a picking any sooner nor has it matured all of its crop quite so early. With me the vine has not been quite so hardy, vigorous or productive as the Earliest of All, but the difference has been so slight as to be of no practical importance. The pods are a little shorter and more cylindrical than those of the Earliest of All and a little less in diameter than those of the American Wonder, and they are less attractive. The green peas are much the best in quality of any of the first early sorts, and superior in sweetness, tenderness and flavor to those of the Station, Eclipse or Gradus. They are better even than Alpha, and, of course, incomparably better than any of the smooth and hard sorts like Earliest of All and First and Best. When ripe they resemble those of the Alpha, being quite as small and wrinkled, but a little more square in shape and a trifle darker in color. I have not had an opportunity to see the variety under field cultivation, and it is hardly fair to judge of the purity and evenness of stock from the small quantities I have seen grown, which have been very good in these respects. It is reputed to come true and to show little tendency to sport. I question whether this will become a popular sort on the market because of its comparatively small and unattractive pods, but it will be welcomed by those whose judgment is not unduly influenced by appearances as a really good first early pea. As far as I can judge from my limited acquaintance with it this is the best first early for the home garden which has yet been produced.

The Gradus Pea.—This variety has been in cultivation in England for several years, but the quantity obtainable has been so small that the past season was the first that it has been extensively tried in this country. The vine grows to the height of from two to three and a half feet, is a little coarse-stemmed, with rather long nodes, and usually bears from four to six large, and two to three smaller pods, the lower one from about the eighth node. It rarely branches, even when given plenty of room, and has not proved with me very hardy or productive, but is better in both these respects than the Telephone was on its first introduction. I believe that stock grown for a few generations in this country will show even greater improvement in these respects than has developed in that variety. The pods first formed can be used about the same time as those of the Alaska or a good strain of Extra Early, but the crop does not mature so early or evenly, and will generally require several pickings to secure it. The individual pods remain in good condition much longer than those of most early sorts. The leaves are above medium size and the stipules are very large, so large as to distinguish the variety from all others, especially as they are a distinct light yellowish green color. The pods in size, shape and color closely resemble those of the Telephone, and are quite as handsome and attractive. They usually contain six to eight peas, and occasionally one is found having as many as ten. The green peas are very large, light bright green, oval in shape, and I think are sweeter and more tender than those of the Telephone. The dry peas are above medium size, coarsely and deeply wrinkled, and when well harvested and cured are a light green color, though if exposed to the sun in harvesting they bleach to a bright light yellow. Most of the stocks we have seen are much more pure and true than one can usually obtain of the newer English sorts, and with me the variety has shown little tendency to sport or run off in type. I am not certain what the future of this new Pea will be. Its earliness, the large size and beautiful appearance of the pod, and the excellent quality of the peas make it a most desirable sort for the market gardener, but its slow maturing, so that it requires a number of pickings to gather the crop, and its habit of growth, which calls for a liberal use of seed, are against it as a commercial variety. But these very qualities are in its favor for use in the home garden, and I think that it will find many friends among amateur gardeners and become extremely popular.

Golden Hubbard Squash.—This new squash has been before the public for two years and has proved to be a distinct and fairly well-fixed variety of evident merit. The vine is vigorous and hardy, in general character like that of Hubbard, but on our rich soils it does not grow quite so rank, and in such cases instead of expending its surplus energy in the production of a few overgrown specimens it tends rather to develop a greater number of fruits of normal size. It matures some of its fruits quite early, nearly as early as the Prolific Marrow, and with me has always given a large crop, which has ripened before and much more uniformly than the Hubbard. The fruits are about the size and shape of a small and rather long Hubbard squash, the length coming from the projections at the stem and blossom ends being rather longer, and they are also generally more curved. It is very hard-shelled and uniformly warty, though the protuberances are smaller and less pronounced than in a warty Hubbard, and the projections at each end are smooth-skinned. When ripe the color is a rich orange-red, of a deeper and redder tint than that of Prolific Marrow, and about one and a half inches of the blossom end is dull olive-green, like a light-colored Hubbard. Some fruits show narrow, indistinct lighter stripes running from the blossom end, similar to those which the seed breeders have tried so hard to get rid of in the Hubbard. With me these fruits have proved as good or better keepers than those of the old sort. The flesh is a deep rich reddish orange color, darker than that of any winter squash I know, very fine-grained and brittle, and I have never seen one which was coarse-grained or had the objectionable green dots and shades found near the skin in most Hubbard squashes. The flesh is, however, only moderately thick, and the sort can probably be improved in this respect by selection. When cooked the flesh is very dry, often rather too much so, of fine color and grain, sweet and good-flavored, practically like that of the Hubbard, though if I were obliged to decide between the two on this point I should give the choice to the older sort.

Since the Hubbard squash was first introduced every few years there has appeared some new variety which it was claimed was better in some respects and just as good in all other particulars, and sure to displace the old sort. But after a few years' trial each of these has disappeared to be followed by another sort with the same history. To-day the majority of gardeners and consumers regard the Hubbard as by far the best winter squash, and I am not bold enough to say that it will ever give place to the Golden Hubbard or any other sort. It seems to me, however, that this new variety has some advantages over the old; it is more desirable in size and it is more uniform in this respect; it matures earlier and more uniformly; the exterior color is far more attractive than the dead green of the old sort; the flesh when cooked is of much better color and is practically the same in quality. It seems to me that the old stock may have to give way to an improved and beautiful descendant.

Detroit, Mich. *Will W. Tracy.*

Amaryllis.

THOSE who saw the magnificent lot of seedling Amaryllis exhibited by Mr. Kenneth Findlayson, gardener for Dr. Weld, Brookline, which were shown in Horticultural Hall, Boston, last spring, will not soon forget it. These gorgeous bulbous plants have been imported at high prices from European raisers. There has been little thought of the possibilities of procuring stock at home. A beginning has been made in southern California, where the climate is favorable, to grow seedlings for the trade supply. The finest varieties, however, do not come in wholesale lots, and it is only by thorough and persistent effort that they are obtainable.

As the season for these remarkable flowers approaches, some account of the methods of seeding and raising them may be timely. To cultivators who can find the time required this will prove an interesting occupation. The flowers do not appear to be self-fertilizing. No seeds are produced unless the work is done artificially. The stamens are always ready before the pistils, whose tips reflex, becoming triclavate and gummy before they are ready to receive the pollen. But as the pollen will keep some time after it is ripe I always take the stamens off before crossing them with other pollen. To indicate how long pollen will keep fresh I was at North Easton one Friday, where the late Mr. William Robinson had some choice varieties in bloom; he kindly packed some stamens in tissue paper, which I put in my pocket, and forgot until the following Sunday. This pollen took well, and now I have a fine batch of seedlings which will flower this winter and spring from these crosses. When the pollen has taken the flowers drop and the capsules swell at once. It takes about six weeks for them to mature, and when ready they open longitudinally. As many as fifty seeds may be produced from a single capsule, and

these will be ready for sowing a few days afterward. I use pans of light soil, setting the seeds with the thin point downward. Light watering and a moderate temperature are sufficient, and the seedlings will be up in from four to five weeks. They may be pricked off in the ordinary way, and will make nice bulbs, though not large enough to flower the first season. Some growers have planted them out for the summer, though the most successful practice I have seen has been to keep them in pots; six-inch size will be large enough until they bloom. Mr. Findlayson's Amaryllises were kept indoors all the time, but this was principally to avoid the Narcissus-fly grub, which has been destructive lately. Until they flower they should be kept growing, but afterward they may be rested annually in the ordinary way.

Wellesley, Mass. *T. D. Hatfield.*

More Orchid-flowering Cannas.

PANDORA is another of the Orchid-flowering Cannas from the list of Dammann & Co. We have the variety from the originators, and have been enjoying its blossoms in the greenhouse since September. The plant is dwarf, growing about three feet high. But these are young plants closely potted in the house, so that we may expect a larger growth of strong plants out-of-doors. The foliage is very dark red, splashed with lighter greenish red. The flowers most closely resemble those of America, described in Garden and Forest, vol. x., p. 178, with the attractive, full-rounded form of those of Italia, with reflexed petals (not staminodia). The petal-like staminodia are bright, fiery cherry-red, heavily splashed and overlaid with a darker velvety red, giving a peculiarly rich appearance. Pandora and America please us the best of all the Italian or Orchid-flowering sorts.

The varieties Bavaria and Burgundia (Dammann) have also been in blossom with us since September 13th. These are both of comparatively dwarf habit, the foliage being smaller and narrower than in the better-known Italia, Austria and Burbank. They both give blossoms of the Italia type, it being frequently difficult or entirely impossible to separate the three, Bavaria, Burgundia and Italia, by the blossoms alone. Bavaria tends to have more solid red at the centre, so that it becomes rather a yellow-bordered flower, of somewhat the same marking as Queen Charlotte; Burgundia is more spotted and looks a trifle more like Florence Vaughan; Bavaria usually has upright petals, while Burgundia commonly shows its Canna flaccida parentage in reflexed petals.

We had Italia and Austria in large beds on the open lawn throughout the summer, where they gave moderate satisfaction. Their large growth and heavy luxuriant leaves give a fresh, semitropical foliage effect worth consideration; but the blossoms are not, upon outdoor plants, an item of much importance.

University of Vermont. *F. A. Waugh.*

Correspondence.

Ideals of Horticultural Instruction.

To the Editor of Garden and Forest:

Sir,—At a recent meeting of the Horticultural Seminar, to which reference was recently made in Garden and Forest (page 438), Professor F. A. Waugh, in the course of a paper on Ideals of Horticultural Instruction, said that in the fourth decade of this century Poiteau, an eminent French horticulturist, published what he considered an ideal course of study for horticultural students. It comprehended instruction in the elementary principles of those natural sciences having a technical application in horticulture, horticultural methods and an introduction to the literature of the subject. The end in view was the acquirement of technical skill.

Present notions of horticultural instruction in many schools are similar in ideals to those held by Poiteau. Obviously, related natural sciences, especially systematic and physiological botany, should precede a course in horticulture. With a course thus arranged, the instructor can pursue his ideal, that of technical instruction. But in some colleges horticulture is prematurely introduced before the prerequisites have been taken; hence more or less of the time that should be devoted to horticulture proper is necessarily spent in giving instruction that should have been previously given in other courses. This is a serious hindrance to the cause of horticultural instruction. In recent years, a few instructors, following Professor Bailey, of Cornell, have been influenced by quite different ideals. These men teach horticulture not merely for horticulture's sake, that is, for immediate practical results, but also, and this primarily, as a disciplinary study in a scheme of liberal education. The former aspect of the subject belongs to technology, and can be taught to children in the industrial schools. The functions and purposes of a college course are different. Here the aim is to teach the student "to observe, to reason accurately, to present his thoughts cogently," and to cultivate the æsthetic tastes; in a word, the development of the mature man. In order to merit a place in a college curriculum, horticulture must confine itself within the scope of college instruction and must be subordinated to its aims. It must conform to the methods and requirements of liberal education in so far as the subject will permit.

Professor Waugh said there are three broad divisions of horticulture, each laid in a different field of knowledge: (1) a science, a branch of botanical science; (2) a philosophy, based on the science, and typified in the evolution course; (3) an art, illustrated in landscape-gardening. But art, science and philosophy are the basis of all university instruction. In such a course as is here advocated, while the student is adding to his general education, he is at the same time developing in sympathy with horticultural pursuits, and gaining an acquaintance with a valuable trade.

Those who follow Poiteau's ideal cultivate the practical side of the subject, in preference to the liberal aspect; their ideal is an institute of horticultural technology. The followers of Professor Bailey bring into the foreground the requirements of a liberal education; and while they teach technology, treat it as of secondary importance. Horticulture is a required study in agricultural colleges generally. For students who do not follow that occupation in after years, the technology is of comparatively little value; while the student who pursues a course shaped according to the second ideal develops in a manner to increase his satisfaction in life, whatever his surroundings may prove to be.

We may apply to horticultural instruction an epigrammatic statement made by President Fairchild, of Kansas, in his address at the Minneapolis meeting of the American Association of Agricultural Colleges, as to the development of agricultural education: "The ideal of agricultural education was first, education *for* agriculture; second, education *in* agriculture; third, education *by* agriculture." This characterization points out a real progress and the different stages of development are each marked.

In a short discussion that followed the reading of the above paper, Professor Waugh expressed his conviction that the greatest need in agricultural education to-day is that of High Schools that shall fit men simply for practical agriculture; and that the next step in agricultural education would be the establishment of such schools.

University of Vermont. *V. A. Clark.*

Chrysanthemums in Boston.

To the Editor of Garden and Forest:

Sir,—At the recent exhibition of Chrysanthemums in Boston it was more than ever apparent that large flowers with strong stems were most popular. The florists' ideal was supreme; and the large vase of magnificent flowers of Mrs. Jerome Jones, shown by E. M. Wood & Co., was the centre of attraction. These were each of the same size, and arranged with such precision that the whole presented an even and rounded mass. That this was in keeping with the popular taste was evident from the frequent comments on other vases which did not show this regularity. There was one, however, in some respects a departure, arranged by Mr. John Ash, gardener for Mrs. Clark, of Pomfret, Connecticut, which the committee recognized by an award, though there were larger flowers in competing vases. While the arrangement of the blooms in all the other vases was uniformly even, and generally conceded to be effective, it was shown by the awards by the committee on plants that the matter of arrangement can be carried to excess. The groups arranged for effect were circular pyramids of single-flowered plants which followed, with one exception, the even plan of arrangement adopted in the vases. Kenneth Findlayson, gardener for Dr. Weld, of Brookline, effectively broke this monotony in his group by the use of a few separate plants, and was rewarded for his efforts.

Complaint is frequently made that naturally grown plants are not seen. The fact is that but few varieties are suitable for growing in this way. Plants like Norma, Golden Ball and many of the pompones stand up well, but the greater number would be accounted untidy if grown naturally. It seems to me there can be no halfway between a natural and a trained specimen. The greatest perfection in training is neatness and finish, just what we complain of when we want an artistic vase

of blooms. Those plants are adjudged best which are symmetrical in form and produce a mass of color. The decisions of the National Committee on Chrysanthemums judged by blooms alone, show that the deeply built incurved flowers which are well adapted for shipping, have been favored most, and even in the class for private growers few others have been recognized, though it may be that few have been offered. It will be seen, further, that when the grower of specimen plants must make his choice from blooms alone, and of this description, he finds few which are really suitable. If he is wise he will keep what is good among the older varieties, though he may be rated behind the times in consequence. Incurved varieties do not make as effective plants as reflexed ones; and when a large number of flowers have to be grown on a plant they are apt to be out of character. Sometimes the flowers are heavy, and the stems need to be supported close up to the flower. This gives a stiffness of arrangement which is far from effective. Experience shows that flowers belonging to the reflexed class, like President Hyde, Cullingfordii and W. H. Lincoln, make the best specimens and keep their character longest.

Wellesley, Mass. *T. D. Hatfield.*

The Forest.

Willows at Chico Forestry Station.

THE Willows receive as yet little attention in California, and the value of our native species is not recognized as fully as it should be, although Salix lasiandra, which closely resembles S. lucida, S. lasiolepis, which somewhat resembles S. humilis, and the more distinct S. lævigata, all native in this state, are often planted for firewood and fencing. The best of the famous Spanish hand-made saddle-trees which were formerly produced in various parts of California and were even shipped to Mexico and Texas, were made of native willow wood, carefully selected and seasoned.

In time there will probably be an extensive demand for basket willows in California, especially for horticultural uses. Salix viminalis and other soft-wooded Osier Willows have been widely distributed for fifteen or twenty years by the Agricultural Department of the University, and have been planted in many places to protect levees and river banks. Aside from these Osiers, from S. Babylonica, and from the native Willows, nothing has been done with Willows in any part of California, although there is now more or less inquiry respecting the best species for cultivation.

The following brief notes upon various Willows planted at Chico Forestry Station were taken late in August of this year, when the season's growth, although not completed, was in most cases nearly so.

Our collection was begun in the spring of 1895 by planting in nursery small cuttings of twenty-four selected species received by mail. The soil is a good Corn land loam, near Chico Creek. Several native species of Willow are on similar soil, within a stone's throw. Again, in 1896 and in 1897, others were added to the collection, which now contains about forty species.

In February, 1896, from five to ten plants of each of the twenty-four species obtained in 1895 were set out in permanent plantation form. They received no irrigation, nor any especial care. The Willows in this plantation are, therefore, about thirty months old from small cuttings. The list includes Salix alba, S. caprea, S. cordata, S. discolor, S. hippophæfolia, S. Japonica, S. Madeni, S. pentandra, S. purpurea, S. Salmoni, S. sericea, S. Sieboldii, S. Villarsiana, S. viminalis, S. daphnoides, S. dasyclades, S. regalis, S. lucida, S. serengeana, S. Babylonica, S. nigra, S. humilis, S. alba vitellina and S. caprea, var. cinerea. Many of these Willows are beautiful in growth, and especially handsome in winter and spring. But since the collection was made in order to introduce the most useful species, I shall only describe those which seem particularly well adapted to California.

The Willow which shows the most remarkable growth is Salix Salmoni, a native of the Levant. This species in that respect much surpasses all our native Willows as well as all others in the plantation. In the nursery the cuttings made roots and thrust up stems of ten feet in length within six months after planting. Five selected trees were cut back to one stem of two feet in height, and planted out in February, 1896. Now, in August, 1897, two of these trees stand respectively thirty-one and thirty-two feet in height, with trunks that exceed eighteen inches in girth at two feet from the ground. The other three are nearly as large. All five trees are beautiful in shape, with the straightest of main stems and with slender, semidrooping branchlets. Like S. alba, the young shoots seem to be well adapted for coarse basket-work if properly grown for that purpose, but the rapid development and hardiness of this tree may give it greater economic value than Poplar or Eucalyptus globulus in some parts of California.

Salix alba and S. alba vitellina come next to S. Salmoni in point of growth, the former rising to a height of twelve feet, the latter to nineteen feet, with trunks which girth eight or nine inches. Although both these Willows are extensively used in Europe for timber, for charcoal, for hoops and basket-work, for tanning materials and other purposes, they do not as yet appear superior to some of our best native species.

Salix pentandra, though less rapid in growth, seems to be worth cultivation. The largest tree stands ten feet high, with a girth of five inches. The large, dark green, smooth and glossy leaves are extremely handsome. This species yields bark that is very rich in salicin, a substitute for quinine and a useful anti-rheumatic.

Salix caprea, another handsome species, grows very rapidly here. The tallest trees are fourteen feet high, with trunks eight inches in girth. The bark is valuable for certain sorts of tanning and the timber is very useful.

The average rates of growth of some leading species, as compared with Salix Salmoni, have been as follows; age, soil, culture and other conditions were the same in all cases:

	Feet.		Feet.
S. Salmoni,	30	S. Sieboldii,	10
S. alba vitellina,	18	S. Madeni,	8
S. regalis,	15	S. cordata,	6
S. caprea,	14	S. viminalis (female plant),	5
S. daphnoides,	13	S. lucida,	4
S. viminalis (male plant),	12	S. purpurea,	4
S. pentandra,	10	S. discolor,	3

The best native Willows under similar conditions appear to rank in point of growth somewhere between Salix Sieboldii and S. regalis.

Niles, Calif. *Charles H. Shinn.*

Recent Publications.

Stories of Insect-Life. By Clarence Moores Weed. Ginn & Company, publishers, Boston and London. 1897.

This little book, of fifty-four pages, bears no introduction or dedication, but is evidently intended for children or those taking their first steps in entomology. It is, in fact, a number of first lessons or a primer which would naturally precede the same author's more elaborate *Life Histories of American Insects*, recently noticed in these pages. The short chapters particularly deal with only a dozen of our most common insects, although their attendant parasites are also noticed. Naturally and properly the first chapter is on "The Tent Caterpillars and their Nests," something that children are most likely to observe and inquire about, and the following chapters tell of "The Moth and its Eggs" and "The Tent Caterpillar Parasite."

The descriptions for the most part are simple and apparently freed as much as possible from technical terms, although there are some points which need to be made clear to the young mind. As there are various species of various genera of tent-building caterpillars it might have been better if the name of Clisiocampa had been given in connection with the species under discussion. It would certainly be no more difficult to master than the word ichneumon which is used, and in the child's mind tent-

caterpillar might mean the Fall Web-Worm, an insect of very different habits and appearance. Other popular subjects arranged for the juvenile mind are on the Common Potato Beetle, the May Beetles or June Bugs, and Cabbage-worms. It is a question whether the Ant-lion, the Lace-wing Fly, or the work of the larva of a Syrphus fly among plant lice are sufficiently well-known subjects to treat in a book or booklet of this kind, when so many more conspicuous or cosmopolitan species are available. The history of the Dobson, although interesting, is a subject likely to be practically understood by a select few who have opportunities for observation in particular localities. In this class is most likely to be the fisherman or boy who frequents the shores of some rocky brook or river; and he may wonder why the adult Dobson should be called a "Hellgramite," a name quite as heavy for the young mind to carry as Clisiocampa for the tent-caterpillar.

Each chapter, however, cannot fail to interest every true observer of animate nature who may be taking first lessons in the wide field which opens before those who enter the domain of Entomology. The pages are well illustrated by numerous original or borrowed figures and the typography is large and clear.

Notes.

The venerable Box-trees in the Bartram Garden, in west Philadelphia, which are probably 150 years old, and now about twenty-five feet high, are still in perfect health and beauty, and show the permanency of this European and Asiatic tree in the Atlantic states, where of late years, at any rate, it has been too generally overlooked by gardeners. Every one knows the value of the dwarf Box for the edgings of garden beds, but it seems less generally known that all of the numerous arborescent forms of Buxus sempervirens are hardy, even in New England. There is something very homelike in the Box and its pleasant odor, even to Americans, who generally know it only in old gardens or in foreign lands, and there is no plant which we can use here safely which is such a cheerful winter inmate of northern gardens; and no other broad-leaved evergreen we can plant grows equally well in the shade of other trees and in the full light of the sun. Most beautiful when it is allowed to grow naturally into a rather open-branched small bushy tree, the Box is also well suited for formal gardening and bears wonderfully well an annual shortening of the branches, which changes the open-headed tree into a dense ball or pyramid which, once formed, can be kept indefinitely in shape.

The berries of Cissus Ampelopsis of the middle and southern states are most remarkable as well as beautiful in color, clear pink, purple, rich blue, and an almost emerald green occurring in the same cluster. The botanies describe them as bluish, bluish or greenish, etc. They much resemble those of the Chinese species, often cultivated in this country for its beautifully colored fruit, and are not less beautiful, but while in the latter the prevailing color is a rich Nile blue verging to emerald green, purple and pink shades, especially the latter being exceptional, the reverse is true with the American species, in which a delicate lilac-pink is the predominating hue. Like the blue berries of Cornus circinata, the berries of this vine, which in the forest completely covers large trees with a luxuriant drapery of foliage, are a favorite fruit of many kinds of birds, particularly the catbird, brown thrasher, wood thrush and flicker, and on this account, if no other, should be grown by all lovers of birds. The fruit of Cissus stans, another southern species, is also very distinct in its coloring, the extremely glossy berries, the size of peas, ranging from light pink, through garnet, red and dark crimson to jet black. The elegant pinnate foliage of this vine is unique in its peculiar dark bluish-green color, the upper surface of the leaves having a semimetallic lustre.

In this winter month vegetables are still shown in great variety not only in the principal markets, but as part of the regular stock in many of the food-supply stores in residence sections of the city. Besides summer crops grown in the north, as Irish potatoes, sweet potatoes, cabbage, celery, onions, pumpkins, Hubbard squash, carrots, parsnips, beets, salsify, celeriac, Jerusalem artichokes, Brussels sprouts, cauliflower and turnips, fresh products from hothouses and southern fields are common. Small carrots in bunches, with fresh tops, are one of the most attractive and showy of the new vegetables; these are grown in frames near by; choice mushrooms now sell at sixty-five cents a pound; radishes, from northern hot-houses, and cucumbers, from Boston, are seen in every collection; the latter cost fifteen cents each. Cucumbers grown out-of-doors in Florida cost half this price. Scalloped squashes, or cymlings, from Florida, at seven cents each; string-beans, at twenty cents a quart; peas, at $1.00 a half-peck, and tomatoes, at twenty cents a pound, are other receipts from the same state. Eggplants, peppers and okra are in regular supply. New beets, from New Orleans, cost seven cents a bunch, and new potatoes, from Bermuda, bring fifty cents a half-peck. Artichokes, from France, sell at twenty-five cents each. Kale, lettuce, spinach, escarole, dandelion, cress, chervil, parsley, corn salad, mint, chives and tarragon are all seen at Kelly's, in Washington Market, many of the more delicate and tender greens coming in neat bunches in small hand-baskets direct from growers in New Jersey and Long Island.

In the November issue of *The Botanical Magazine*, Sir Joseph Hooker figures and describes Mammea Americana (t. 7562), a West Indian tree cultivated for its edible fruit, the mammee apple, which occasionally finds its way into the fruit-stores of this city. The fruit, which Sir Joseph Hooker has eaten on the Cape de Verde Islands, where this tree was early introduced, he compares to a good turnip with a sweetish and faintly aromatic flavor. The Mammea Americana is a large umbrageous tree from sixty to seventy feet in height, with a stout trunk and a dense head of thick branches covered with dark brown bark. The handsome white flowers are produced singly or in from two to four flowered clusters directly from the wood of the branches in the axils of fallen leaves, and are fragrant and about an inch and a half in diameter. The fruit, which varies from that of the size of an orange to that of a child's head, is hemispherical or nearly so, with a rough, leathery yellow bitter rind and a thinner interior skin enclosing a firm, somewhat spongy white pulp soon turning yellowish and of a hard fibrous consistency. This pulp surrounds from one to four large brown oblong, rather compressed rugose nuts with hard fibrous coats and oily, fleshy cotyledons. By the Portuguese and early British residents in the West Indies the fruit was cut in pieces and eaten with wine and sugar, and also preserved. A liquor called Eau de Creole and Créme des Creoles is obtained by distillation from the flowers infused in spirits of wine. From the bark an acrid resinous gum is obtained and the cotyledons yield hair oil. The wood is described as being comparatively worthless, but the tree with its brilliant green leaves and deliciously scented flowers is so handsome an object that Tussac, in his Flora of the Antilles, where it is well figured, speaks of it as "La Sirène Végétale."

The following note by Mr. W. L. Jepson, published in the November issue of *Erythea*, will interest, perhaps, those who have been successful in cultivating Carpenteria Californica, one of the most beautiful flowering shrubs of the Pacific states. "The first collector of this plant, as is well known, was General Fremont, who obtained it on one of his expeditions through the interior of California. No definite locality was known for Carpenteria until Dr. Gustav Eisen rediscovered it in Fresno County, on Big Dry Creek, in the foot-hills north-east of Fresno City. The shrubs, of which there were probably about 1,000, grew on the southern exposure of a chaparral hill about a mile above the toll-house, near what is known as the Grape Vine Spring, on the road to Pine Ridge. The altitude is about 3,500 feet, where are found the last Digger Pines (Pinus Sabiniana) and the first Sugar Pines (Pinus Lambertiana); it is also the lower limit of Fremontia, which extends 500 feet higher up. The shrubs were about seven to eight feet in height, and the flowers very striking in their showiness. The particular hill on which the species was found was about a mile in circumference. Big Dry Creek does not empty into Kings River, but loses itself in the San Joaquin Plains. Dr. Eisen collected about twenty-five pounds of the fruit, which was sent to a Washington florist, who distributed seed to other florists of the eastern United States and Europe. From such a source came the plants that were offered for sale in their catalogues. From seed of the same collection a single plant was also grown in the experimental garden of the Department of Agriculture of the University of California. This bush has never fruited, but it has been easily propagated by cuttings. The above account of the single known locality was drawn up from a verbal description by Dr. Eisen. The rediscovery of the species was made in 1875 and the locality was revisited during several years thereafter."